LA-UR-01-4825

Title	*Breeding Bird Surveys on Los Alamos National Laboratory: 2001*
Author	*Jessica Jewell*

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Los Alamos, New Mexico 87545

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INTRODUCTION

In July 2001, the Ecology group Biology Team conducted breeding bird surveys (BBS) within Los Alamos National Laboratory (LANL) boundaries. The Biology Team works with the Department of Energy to maintain the Laboratory's compliance with environmental legislation. Migratory songbirds are protected under the Migratory Bird Treaty Act, and a recent Executive Order calls for greater protection of migratory birds and their habitats. In response, we're expanding our site-wide bird monitoring activities to better manage migratory species.

The purpose of conducting BBS is to determine the abundance, distribution, and population trends of songbird species (Ralph et al., 1993). These data provide useful information for both management and research purposes. Also, BBS are relatively inexpensive and provide high-quality and -quantity data at a low cost. This report summarizes the effort and results of the 2001 BBS.

METHODS

We conducted BBS in eight areas on seven days between 17 and 26 July (Table 1). Of these eight areas, surveys were conducted in seven of the same areas as in previous years. In addition, this year we initiated a survey in Technical Area (TA) 62.

Table 1. Survey site names and survey dates, 2001.

Site Name	Survey Date
Cañada del Buey	17-Jul-01
TA-62	18-Jul-01
Los Alamos Canyon	19-Jul-01
Pueblo Canyon	24-Jul-01
Rendija Canyon	23-Jul-01
Mortandad Canyon	25-Jul-01
TA-33	26-Jul-01
Water Canyon-East	26-Jul-01

For each area, we recorded the site name, survey date, habitat type, start and end temperature, wind speed (Table 2, Appendix A), and cloud cover. Surveys commenced at sunrise and were completed within four hours. All surveys were conducted at one-half-mile intervals along established roads.

At each point, we recorded habitat type and used a Geographic Positioning System (GPS) to collect location data. The start time for each point was recorded, and a single observer recorded all birds seen or heard from a stationary point for a total of six minutes. Data were separated into those individuals seen or heard during 0 to 3 minutes, 3 to 5 minutes, and 5 to 6 minutes. Further, we estimated the distance of individuals from the observer upon initial detection. The distance categories are 0 to <25 meters, ≥25 to <50 meters, ≥50 to <75 meters, ≥75 to <100 meters, ≥100 meters, or fly over.

Table 2. Wind speed chart.

Beaufort Scale	
0	Smoke rises vertically (<1 mph, <2 Kph)
1	Wind direction shown by smoke drift (1 to 3 mph, 2 to 5 Kph)
2	Wind felt on face; leaves rustle (4 to 7 mph, 6 to12 Kph)
3	Leaves, small twigs in constant motion (8 to12 mph, 13 to19 Kph)
4	Dust rises; small branches move (13 to 18 mph, 20 to 29 Kph)
5	Small trees in leaf begin to sway (19 to 24 mph, 30 to 38 Kph)

RESULTS

A total of 51 species and 770 detections were made at 52 survey points. Appendix B lists common names with corresponding scientific names. The most common species were pine siskin, violet-green swallow, spotted towhee, western wood peewee, mourning dove, lesser goldfinch, broad-tailed hummingbird, white-breasted nuthatch, chipping sparrow, Cassin's kingbird, and American robin (Table 3).

Table 3. Ten most common species detected on breeding bird surveys, 2001.

Species	Number Detecions	% Total Detections
Pine Siskin	117	15%
Violet-Green Swallow	94	12%
Spotted Towhee	55	7%
Western Wood-Pewee	41	5%
Mourning Dove	36	5%
Lesser Goldfinch	31	4%
Broad-tailed Hummingbird	29	4%
White-breasted Nuthatch	29	4%
Chipping Sparrow	27	4%
Cassin's Kingbird	26	3%
American Robin	23	3%

Of the 52 survey points, 24 (46%) were in piñon-juniper woodlands, 20 (38%) in ponderosa pine, 3 (6%) in grass lands, 2 (4%) each in mixed conifer and oak/pine, and 1 (2%) in a burned area (Figure 1; Appendix C).

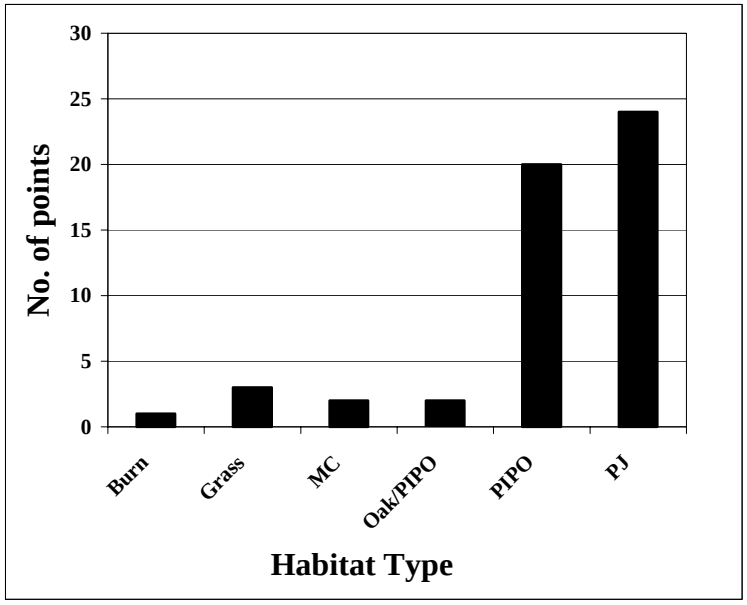

Figure 1. Distribution of survey points by habitat type. MC = mixed conifer, Oak/PIPO = oak/ponderosa pine, PIPO = ponderosa pine, and PJ = piñon-juniper.

Of the 51 species detected, we observed 39 (76%) in piñon-juniper woodland, 37 (73%) in ponderosa pine, 22 (43%) in grass, 12 (24%) in mixed conifer, 11 (22%) in burn, and 10 (20%) in oak/pine habitat (Figure 2).

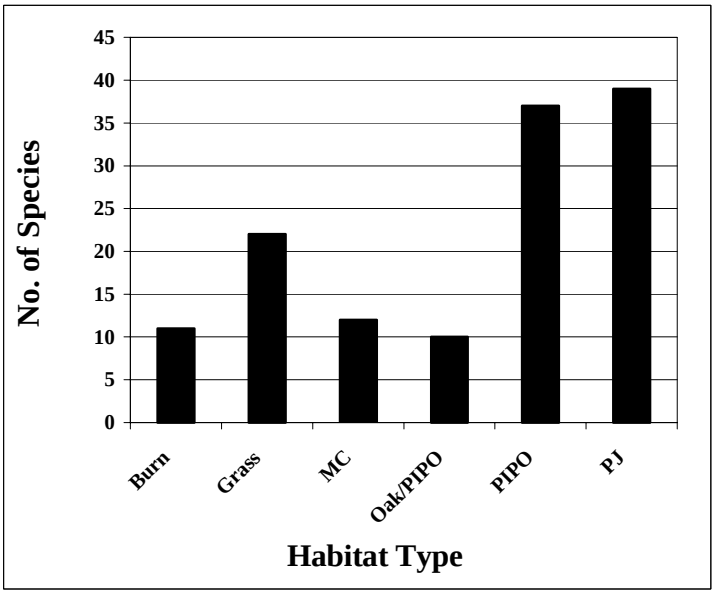

Figure 2. Distribution of species by habitat type.

Within the first three minutes of surveying, we detected 484 (63%) individuals (Figure 3). Between 3 to 5 minutes, 169 (22%) individuals were detected, and 117 (15%) individuals were detected in the last minute of survey time.

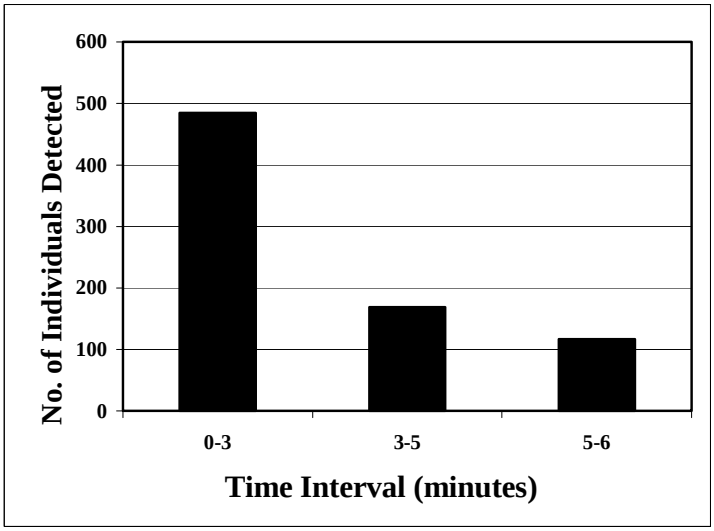

Figure 3. Number of individuals detected at three time intervals: 0 to 3 minutes, 3 to 5 minutes, and 5 to 6 minutes.

Of 770 detections, 248 (32%) were 0 to 25 meters from the observer; 161 (21%) were detected between 25 to 50 meters, 129 (17%) were detected between 50 to 75 meters, 49 (6%) were detected between 75 to 100 meters, 28 (6%) were detected at >100 meters, and 158 (20%) were detected as fly overs (Figure 4).

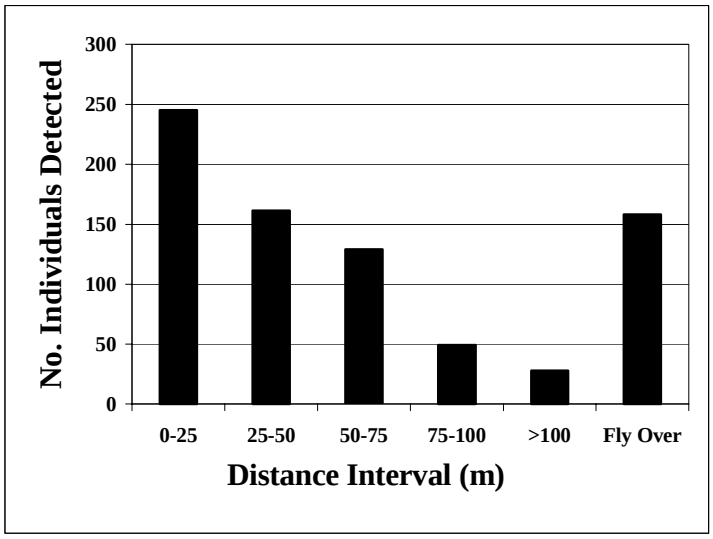

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Figure 4. Number of individuals detected at six distance intervals.

DISCUSSION/RECOMMENDATIONS

The results of the 2001 BBS increase our awareness of avian activity on LANL property. This year, we surveyed 52 points in six habitat types. To provide meaningful data, 50 stops should be made in exactly the same location from year to year (Sauer et al., 2001). To facilitate this, we collected location data with a GPS and mapped these points in ArcView (Appendix C). For maximum consistency, we recommend surveying points on the same day and at the same time as previous surveys.

Seven of the survey areas have been inventoried in previous years: Los Alamos Canyon, Mortandad Canyon, Cañada del Buey, Water Canyon-East, TA-33, Pueblo Canyon, and Rendija Canyon (see Table 1). To these we added one new survey area – TA-62. The addition of TA-62 increases the amount of ponderosa pine habitat included in the BBS (see Figure 1). Four areas surveyed in previous years within the Dynamic Experimentation Division management area (Potrillo Canyon, Water Canyon-West, TA-14, and TA-67) were not sampled this year because of time constraints and access issues. To gain access to these sites in time for BBS, we recommend initiating the paperwork in the spring.

Because we surveyed in July, we likely did not detect some species that breed earlier in the season and detected some non-breeding species. For example, warbler species are likely under-represented this year and the rufous hummingbirds detected are likely migrants. Nonetheless, data collected this season (see Table 3) can be compared to data collected in July in other years.

LANL land cover is comprised of approximately 50% piñon-juniper woodland and 30% ponderosa pine (Koch et al., 1997). Representatively, of the 52 points surveyed this year, 46% were in piñon - juniper woodlands and 38% were in the ponderosa pine (see Figure 1). As a result of the Cerro Grande Fire, burned areas on LANL significantly increased; yet, only 2% of survey points were located in burned areas. Surveys in burned areas may provide interesting information regarding species composition in relation to successional processes, therefore, we suggest increasing the number of points in burned areas. Another point of interest is the apparent species richness in areas with a strong grassland component (see Figure 2). This season, a total of 51 species were detected in all habitat types. Twenty-two (43%) species were detected in grass areas, however, only 2% of all the areas surveyed were classified as grass.

Most individuals were detected within the first three minutes of surveying (see Figure 3). However, because some species are more difficult to detect than others, surveying for a total of six minutes should continue. The number of individuals detected decreased with distance from the observer (see Figure 4). For future surveys, we recommend investigation into distance sampling methods. Distance sampling requires the observer to estimate the distance to an individual to the nearest meter rather than grouping the individual in a distance band (for example, 0 to 25 meters). This method provides a continuous data set and can better accommodate statistical analysis related to species density.

This season, we recorded start and end temperature, estimated percent cloud cover, and wind speed. We recommend future surveys record using sky condition codes (Table 4) instead of estimated percent cloud cover because it is consistent with standardized BBS protocol.

Table 4. Recommended future sky condition codes.

Sky Condition Code	
0	Clear or few clouds
1	Partly cloudy (scattered) or variable sky
2	Cloudy (broken) or overcast
4	Fog or smoke
5	Drizzle
7	Snow
8	Showers

ACKNOWLEDGMENTS

Much thanks to Tim Haarmann for providing me the opportunity to take a leadership role on this project and to Randy Balice for granting me time away from vegetation surveys. David Keller and Steve Koch provided invaluable background information and logistical support, and Tyler Morrison and Dan Reich were great field companions.

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APPENDIX A

Example of Data Form Used in this Survey

POINT COUNT DATA FORM **PAGE /**

SITE: ______________ DATE: ______________ OBSERVER: ___________ ROVER FILES:______________

WEATHER: START: TEMPERATURE (°C): ________ WIND SPEED (MPH): _____CLOUD COVER (%): ___________

END: TEMPERATURE (°C): ________ WIND SPEED (MPH): ______CLOUD COVER (%): ___________

HABITAT TYPE: ____

										0-3 MINUTES		3-5 MINUTES		5-6 MINUTES	
PT. NUMBER		START TIME				SPECIES				DISTANCE	FLY OVER	DISTANCE	FLY OVER	DISTANCE	FLY OVER

APPENDIX B

Correspondence Between the Common and Scientific Names of Avian Species

Species List
Alphabetized by common name

Acorn Woodpecker	*Melanerpes formicivorus*
American Goldfinch	*Carduelis tristis*
American Robin	*Turdus migratorius*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Bewick's Wren	*Thryomanes bewickii*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Broad-tailed Hummingbird	*Selasphorus platycercus*
Brown Creeper	*Certhia americana*
Bushtit	*Psaltriparus minimus*
Canyon Towhee	*Pipilo fuscus*
Canyon Wren	*Catherpes mexicanus*
Cassin's Kingbird	*Tyrannus vociferans*
Chipping Sparrow	*Spizella passerina*
Clark's Nutcracker	*Nucifraga columbiana*
Common Nighthawk	*Chordeiles minor*
Common Raven	*Corvus corax*
Cordilleran Flycatcher	*Empidonax occidentalis*
Golden-crowned Kinglet	*Regulus satrapa*
Grace's Warbler	*Dendroica graciae*
Gray Flycatcher	*Empidonax wrightii*
Hairy Woodpecker	*Picoides villosus*
Hepatic Tanager	*Piranga flava*
Hermit Thrush	*Catharus guttatus*
House Finch	*Carpodacus mexicanus*
Juniper Titmouse	*Baeolophus ridgwayi*
Lark Sparrow	*Chondestes grammacus*
Lesser Goldfinch	*Carduelis psaltria*
Mountain Chickadee	*Poecile gambeli*
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Pine Siskin	*Carduelis pinus*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Plumbeous Vireo	*Vireo plumbeus*
Pygmy Nuthatch	*Sitta pygmaea*
Red Crossbill	*Loxia curvirostra*
Red-tailed Hawk	*Buteo jamaicensis*
Rock Wren	*Salpinctes obsoletus*
Rufous Hummingbird	*Selasphorus rufus*
Spotted Towhee	*Pipilo maculatus*
Steller's Jay	*Cyanocitta stelleri*
Townsend's Solitaire	*Myadestes townsendi*
Vesper Sparrow	*Pooecetes gramineus*
Violet-green Swallow	*Tachycineta thalassina*
Warbling Vireo	*Vireo gilvus*

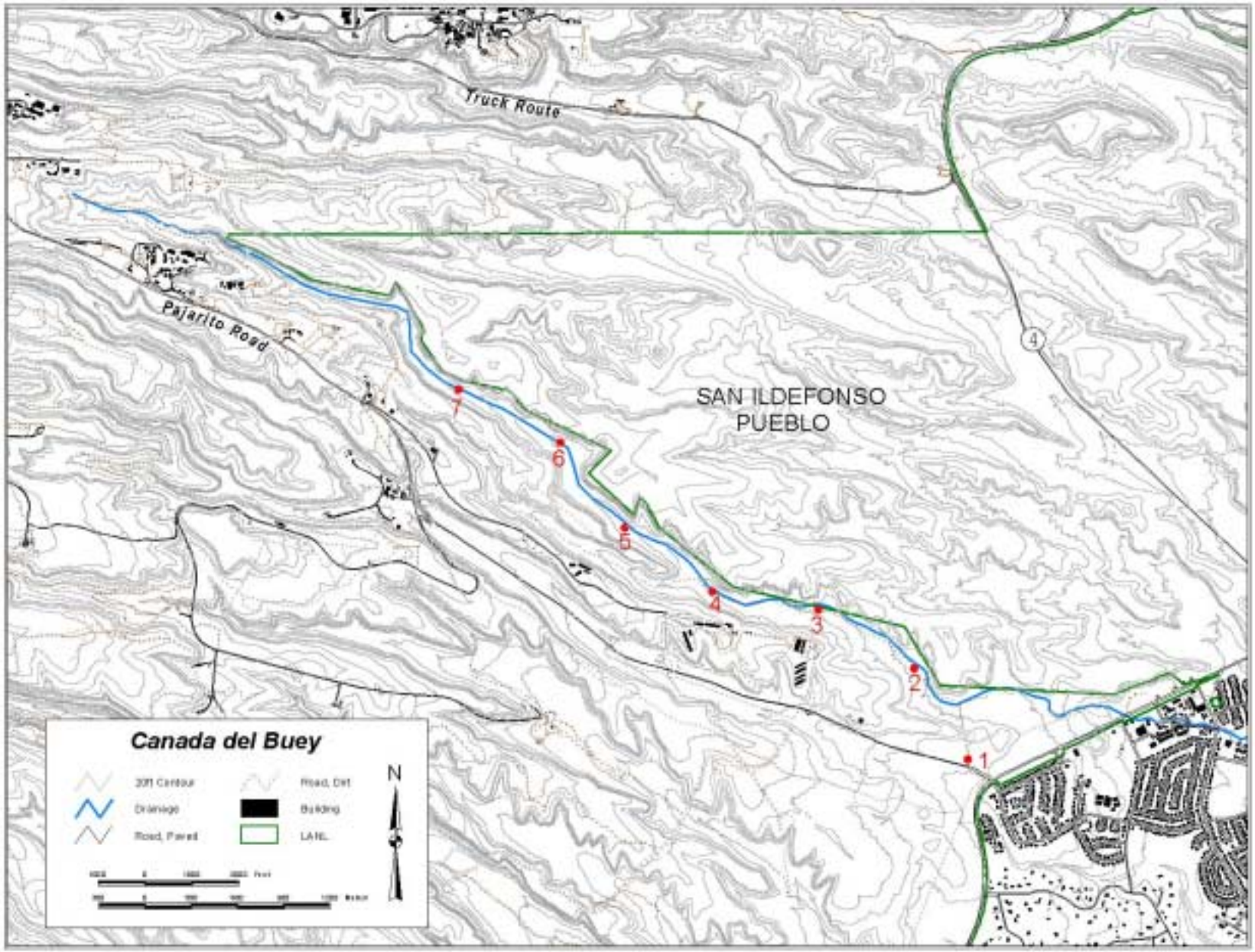
Western Bluebird	*Sialia mexicana*
Western Scrub-Jay	*Aphelocoma californica*
Western Tanager	*Piranga ludoviciana*
Western Wood-Pewee	*Contopus sordidulus*
White-breasted Nuthatch	*Sitta carolinensis*
White-throated Swift	*Aeronautes saxatalis*

APPENDIX C

Maps and UTM Coordinates of BBS Points

UTM Coordinates

Site Name	Point	UTM (X)	UTM (Y)
Cañada del Buey	1	389 495	3 965 156
Cañada del Buey	2	389 153	3 965 761
Cañada del Buey	3	388 522	3 966 154
Cañada del Buey	4	387 827	3 966 287
Cañada del Buey	5	387 255	3 966 711
Cañada del Buey	6	386 836	3 967 281
Cañada del Buey	7	386 173	3 967 635
TA-62	1	379 646	3 970 618
TA-62	2	378 882	3 970 605
TA-62	3	378 499	3 970 739
TA-62	4	379 145	3 971 123
TA-62	5	379 629	3 971 109
Los Alamos Canyon	1	389 555	3 969 835
Los Alamos Canyon	2	388 921	3 970 053
Los Alamos Canyon	3	388 156	3 970 272
Los Alamos Canyon	4	none	none
Los Alamos Canyon	5	386 586	3 970 639
Los Alamos Canyon	6	385 811	3 970 484
Los Alamos Canyon	7	385 072	3 970 646
Los Alamos Canyon	8	384 220	3 970 805
Los Alamos Canyon	9	383 569	3 970 960
Rendija Canyon	1	385 472	3 974 542
Rendija Canyon	2	385 279	3 974 720
Rendija Canyon	3	385 718	3 974 920
Rendija Canyon	4	384 961	3 975 044
Rendija Canyon	5	384 344	3 975 765
Rendija Canyon	6	383 707	3 974 660
Pueblo Canyon	1	390 020	3 970 225
Pueblo Canyon	2	389 213	3 970 461
Pueblo Canyon	3	388 784	3 970 889
Pueblo Canyon	4	388 427	3 971 430
Pueblo Canyon	5	387 648	3 971 401
Pueblo Canyon	6	386 929	3 971 640
Pueblo Canyon	7	386 140	3 971 794
Pueblo Canyon	8	385 525	3 971 875
Pueblo Canyon	9	384 677	3 972 016
Mortandad Canyon	1	384 454	3 969 089
Mortandad Canyon	2	385 268	3 968 965
Mortandad Canyon	3	386 110	3 969 015
Mortandad Canyon	4	386 819	3 968 834
Mortandad Canyon	5	386 793	3 969 045
Mortandad Canyon	6	385 976	3 969 202
Mortandad Canyon	7	385 174	3 969 238
Mortandad Canyon	8	387 933	3 968 655
Mortandad Canyon	9	387 293	3 968 832
Water Canyon-East	1	387 377	3 962 136
Water Canyon-East	2	388 195	3 961 976
Water Canyon-East	3	388 872	3 961 617
TA-33	1	386 872	3 961 617
TA-33	2	387 480	3 959 912
TA-33	3	388 064	3 959 447
TA-33	4	388 789	3 959 411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PUEBLO
1
2
3
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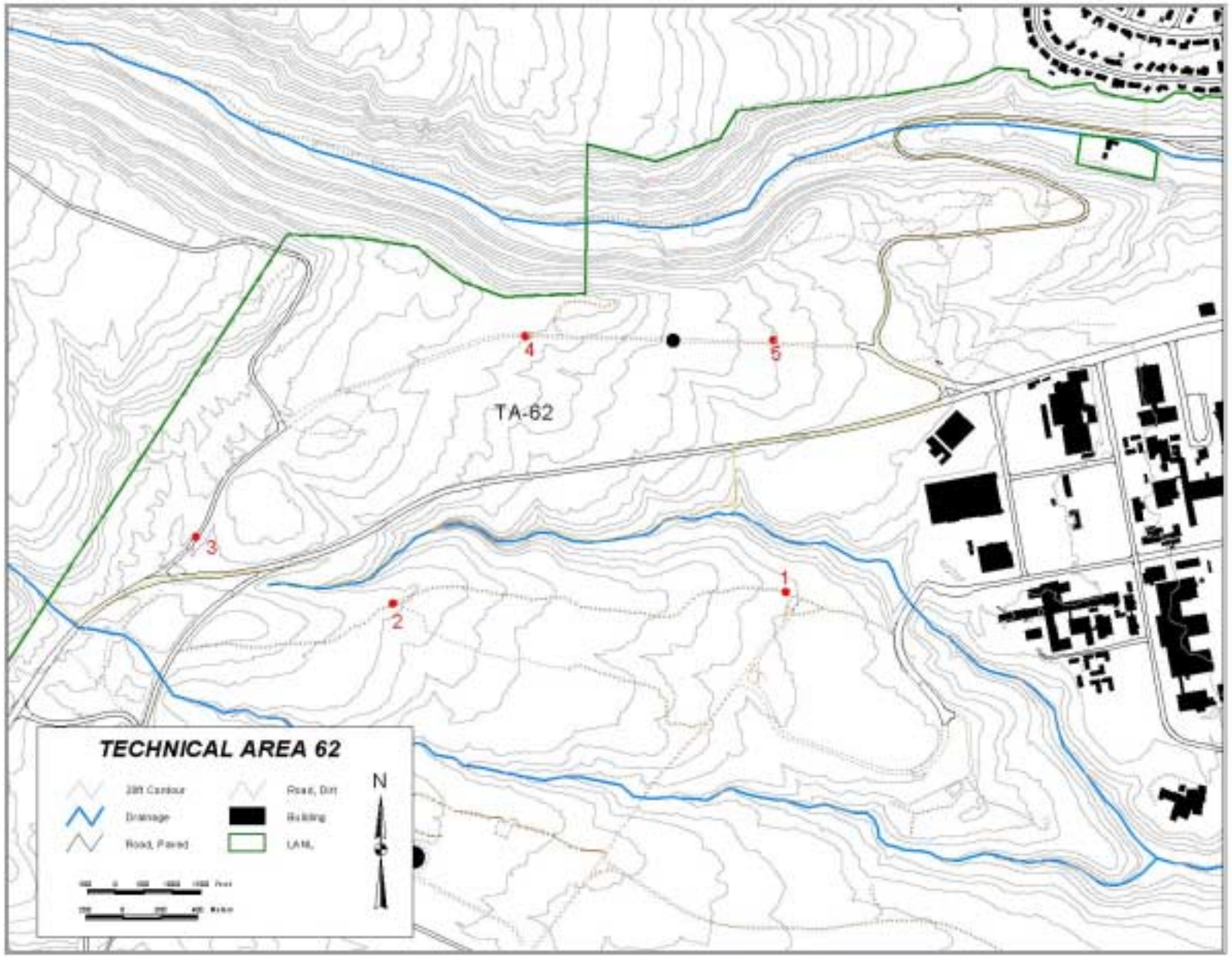
6
7
Canada del Buey
N


TA-62
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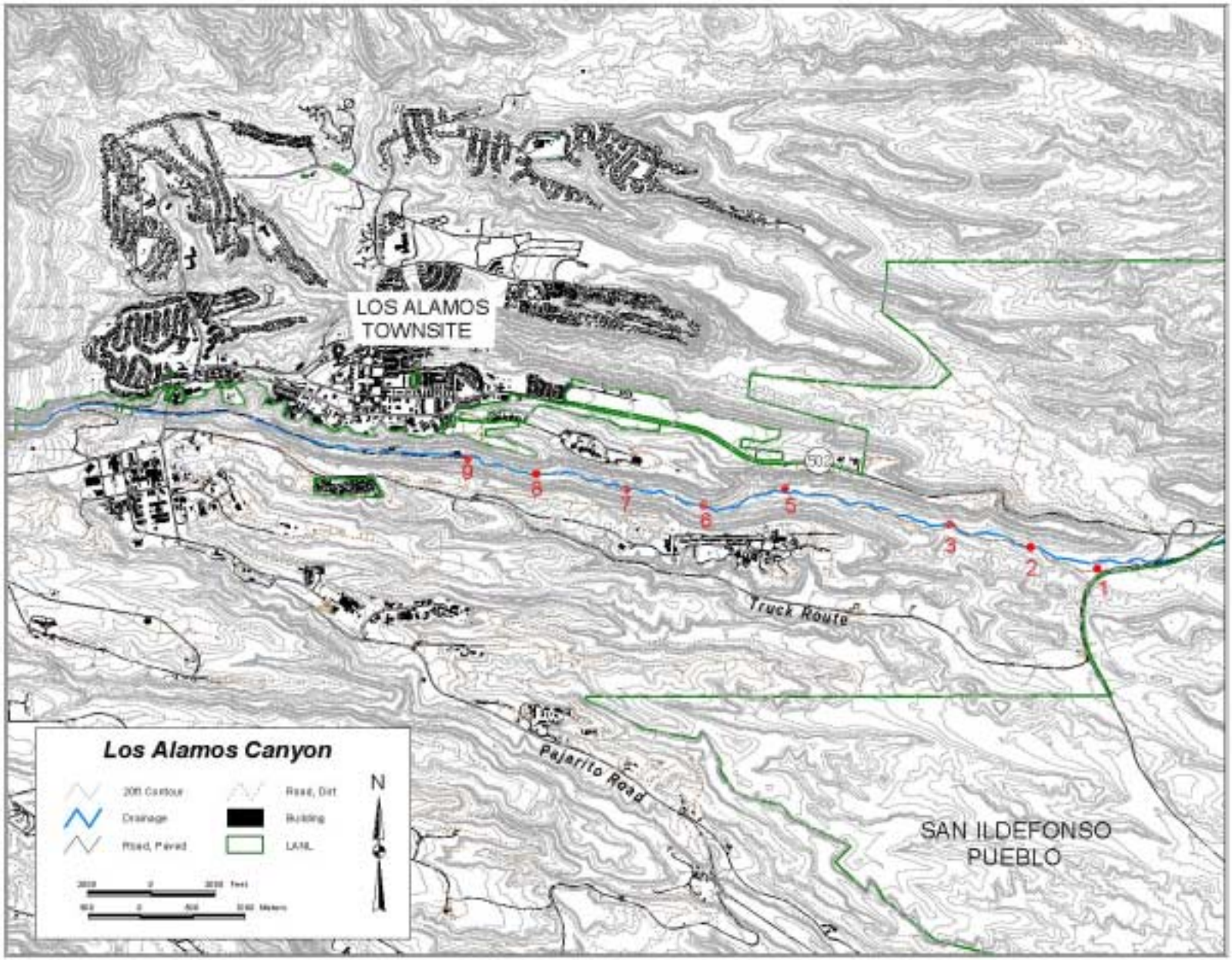
4
5
TECHNICAL AREA 62
N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Los Alamos Canyon
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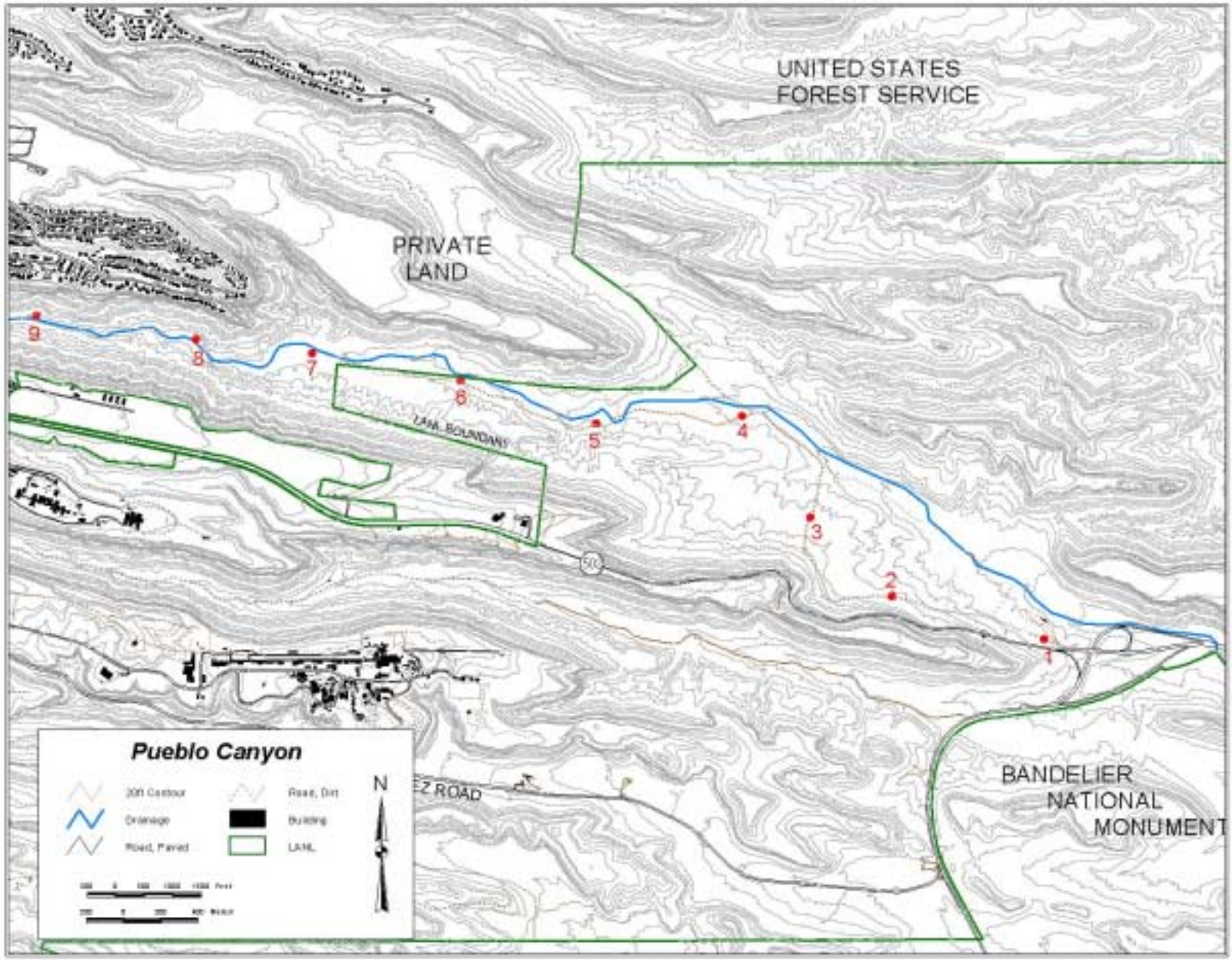
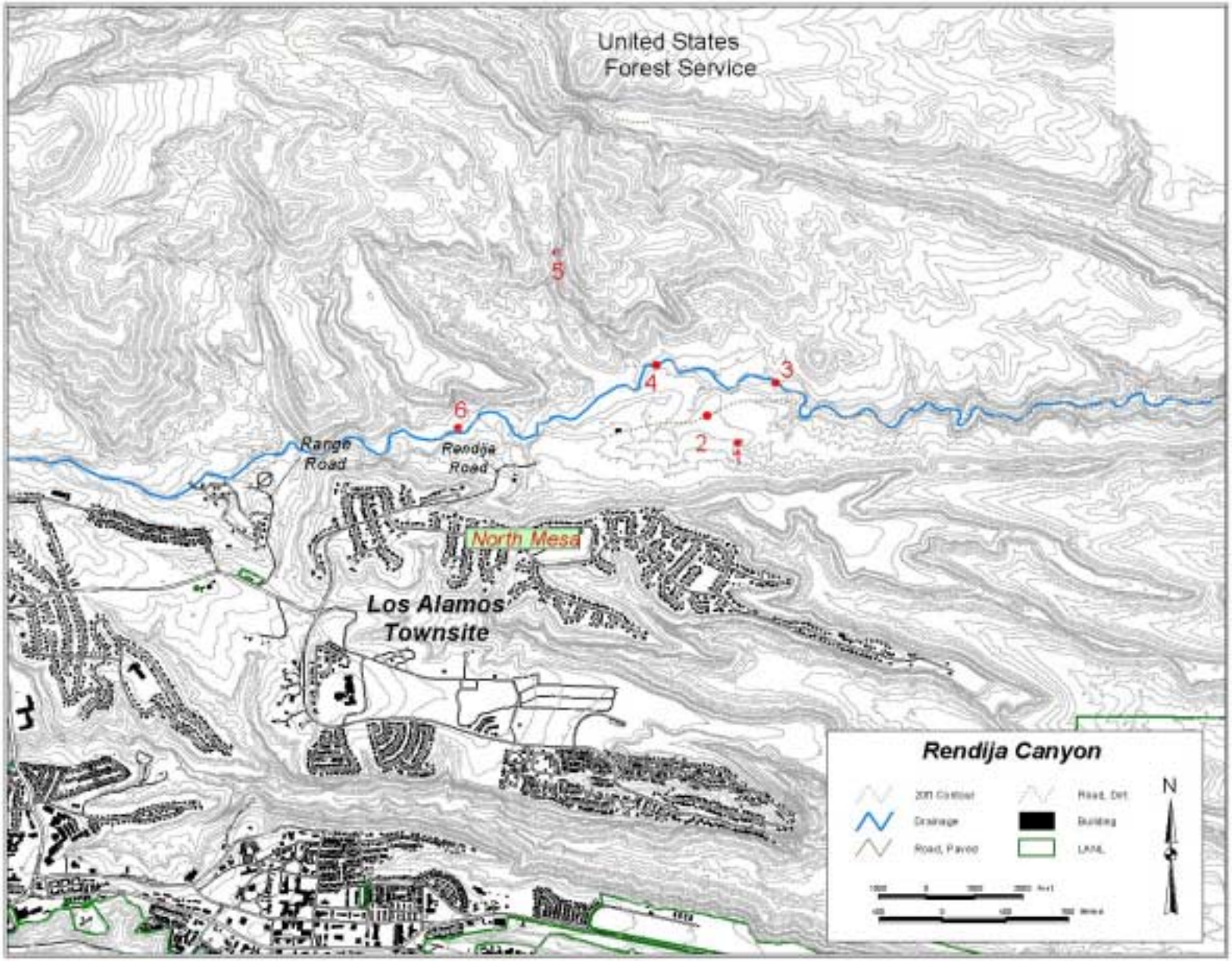

UNITED STATES
FOREST SERVICE
PRIVATE
LAND
9
8
7
6
5
4
3
2
1
LAND BOUNDARY
Pueblo Canyon
20ft Contour
Drainage
Road, Paved
Road, Dirt
Building
LAND
N
BANDELIER
NATIONAL
MONUMENT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Range
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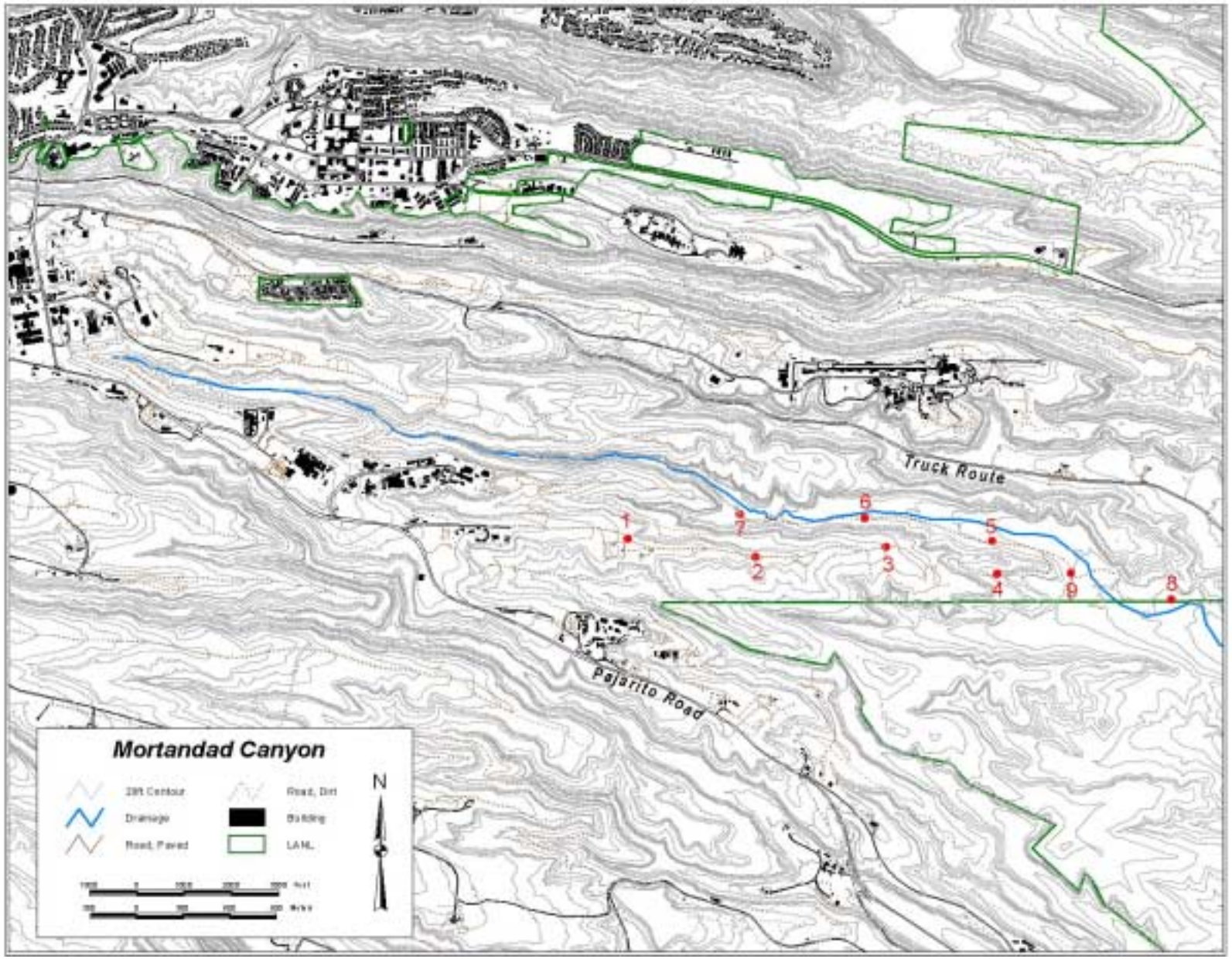
Mortandad Canyon
285 Contour
Drainage
Road, Paved
Road, Dirt
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LANL
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Truck Route
Pajarito Road
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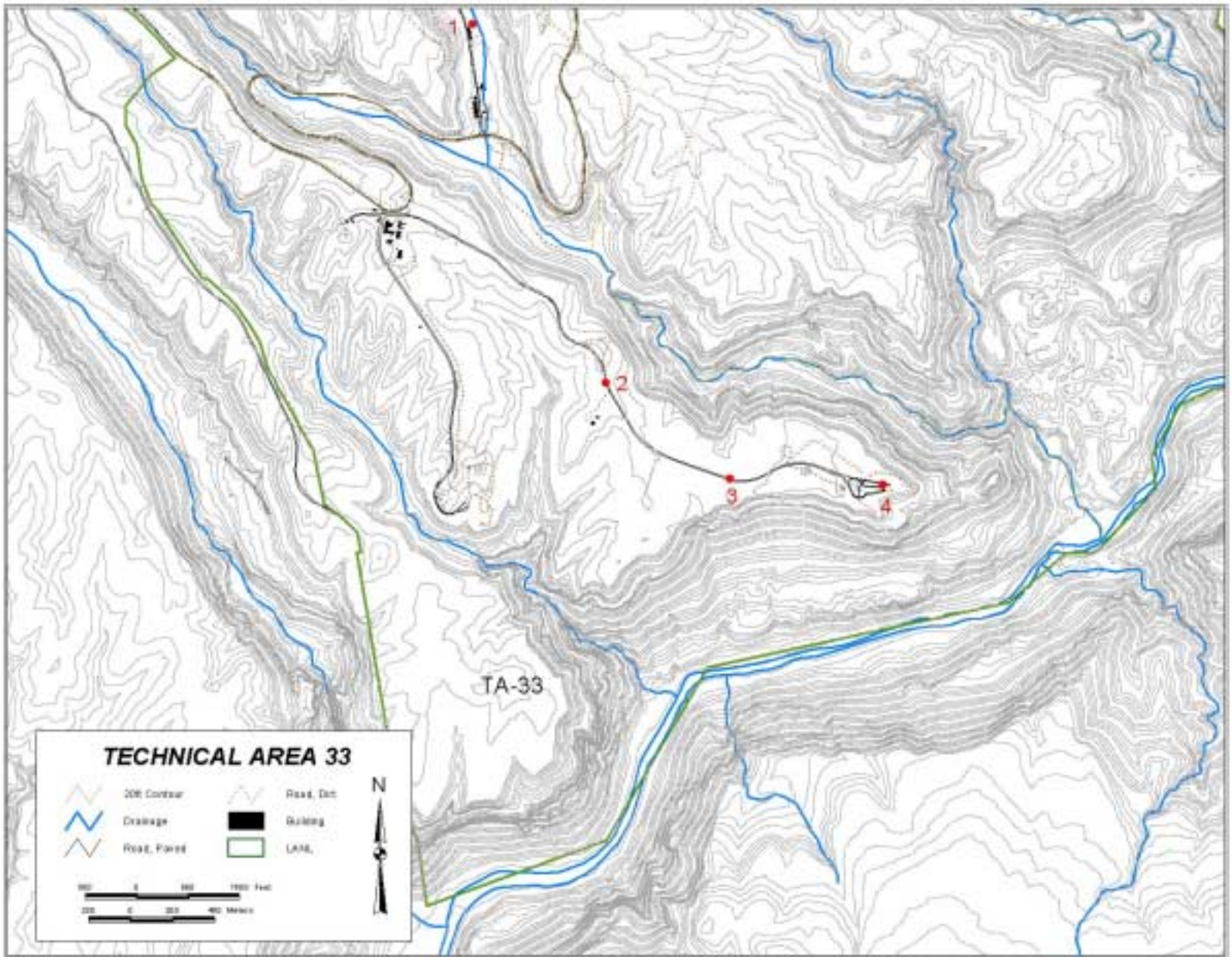
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TA-33
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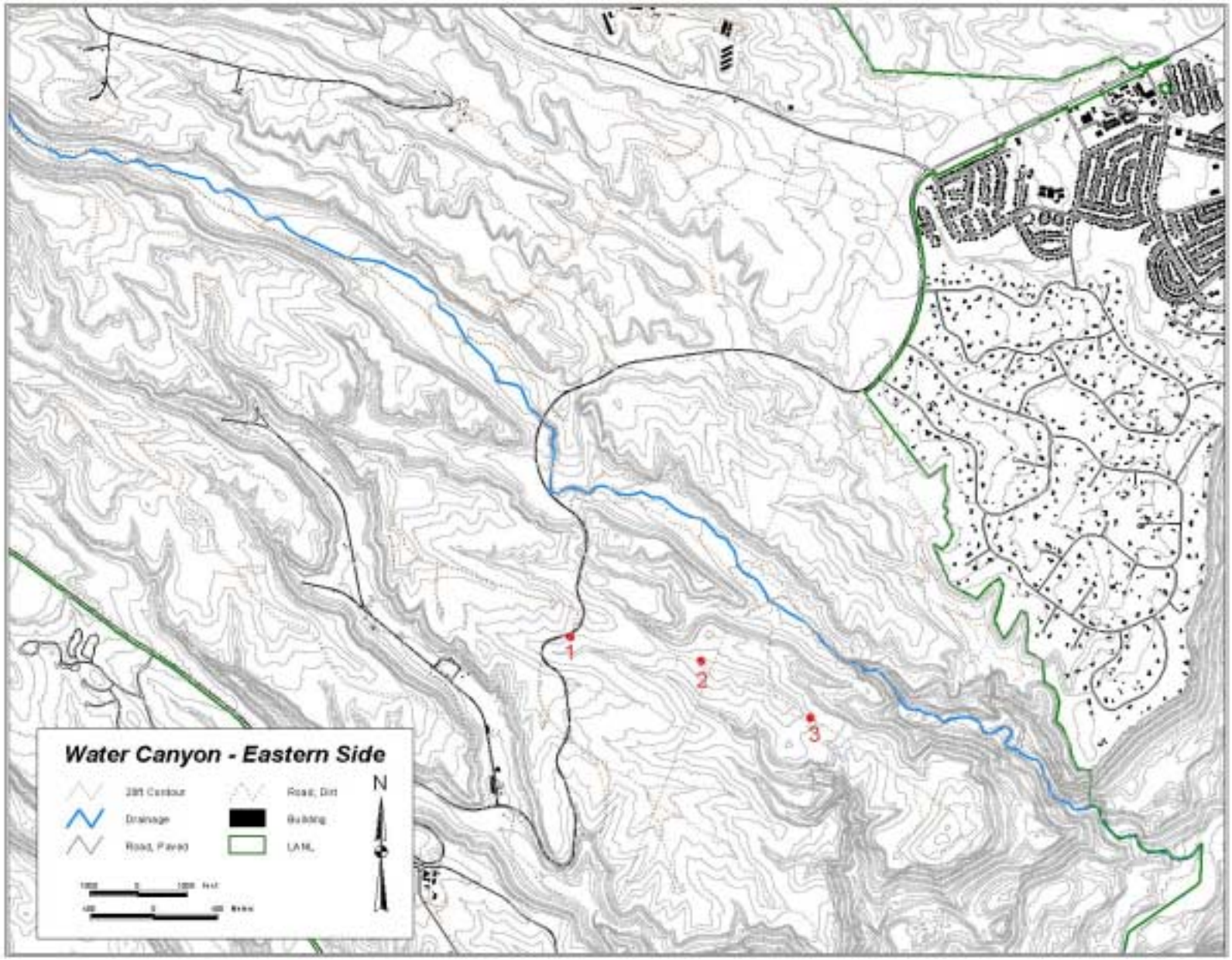
Water Canyon - Eastern Side
285 Contour
Drainage
Road, Paved
Road, Dirt
Building
LANL
N
1
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3

Los Alamos, New Mexico 87545